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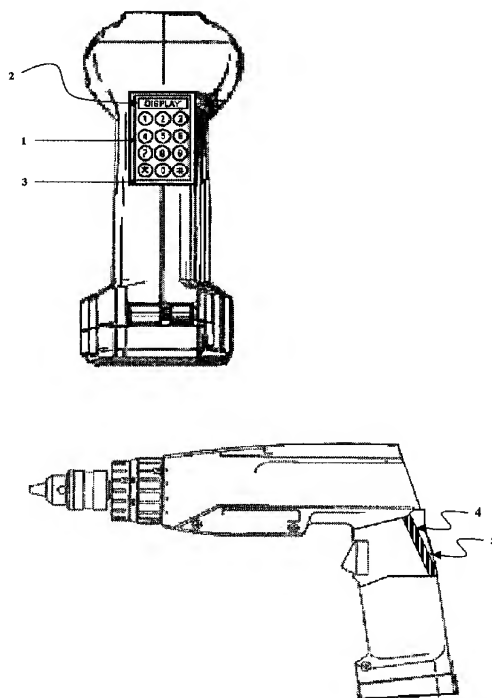
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(54) **CODE D'ACTIVATION ET SYSTEME D'IDENTIFICATION DU
PROPRIETAIRE POUR OUTILS ELECTRIQUES**

(54) **ACTIVATION CODE AND OWNERSHIP IDENTIFICATION
SYSTEM FOR POWER TOOLS**



(57) An activation code and ownership identification system for power tools, includes a code input device for inputting a code; a storage device for storing a predetermined code; an electronic system for comparing the inputted code with the stored code; an enabling device or relay actuated when the inputted code corresponds to the stored code; a first timer to actuate a relay; a second timer for the display device. The activation code and ownership identification system is an anti-theft security device for power tools. The activation system effective, when actuated, to enable electricity to the power tool switch, this is accomplished via a timer-controlled relay. An authorized user inputs a code into the keypad to activate the relay and allow the power tool switch to access electricity. The code-input device is a keypad located on the upper back portion on the handle of the power tool. The activation control system includes a display device that displays numeric information regarding the owner or authorized possessor of the power tool. The activation code component of the system includes a first timer of up to several hours and operates in conjunction with the relay that closes the circuit allowing electricity to be accessed by the tool switch once the inputted code is verified. The relay is reset to the off position opening the circuit to the power tool switch once the first timer is expired, and the power tool is not able to access electricity until the code is re-entered and verified. The ownership identification component of the system operates with a second timer to display numeric information regarding the owner or possessor of the power tool. The activation code and ownership identification system for power tools also includes a programmable non-volatile memory for programming digits into the system via the keypad for the display device. The authorized user may also program codes into the programmable non-volatile memory that actuate the relay. The activation code and ownership identification system for power tools is applicable to battery operated (cordless) and cord attached (corded) power tool equipment.



ABSTRACT

An activation code and ownership identification system for power tools, includes a code input device for inputting a code; a storage device for storing a predetermined code; an electronic system for comparing the inputted code with the stored code; an enabling device or relay actuated when the inputted code corresponds to the stored code; a first timer to actuate a relay; a second timer for the display device. The activation code and ownership identification system is an anti-theft security device for power tools. The activation system effective, when actuated, to enable electricity to the power tool switch, this is accomplished via a timer-controlled relay. An authorized user inputs a code into the keypad to activate the relay and allow the power tool switch to access electricity. The code-input device is a keypad located on the upper back portion on the handle of the power tool. The activation control system includes a display device that displays numeric information regarding the owner or authorized possessor of the power tool. The activation code component of the system includes a first timer of up to several hours and operates in conjunction with the relay that closes the circuit allowing electricity to be accessed by the tool switch once the inputted code is verified. The relay is reset to the off position opening the circuit to the power tool switch once the first timer is expired, and the power tool is not able to access electricity until the code is re-entered and verified. The ownership identification component of the system operates with a second timer to display numeric information regarding the owner or possessor of the power tool. The activation code and ownership identification system for power tools also includes a programmable non-volatile memory for programming digits into the system via the keypad for the display device. The authorized user may also program codes into the programmable non-volatile memory that actuate the relay. The activation code and ownership identification system for power tools is applicable to battery operated (cordless) and cord attached (corded) power tool equipment.

ACTIVATION CODE AND OWNERSHIP IDENTIFICATION SYSTEM FOR POWER TOOLS

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BACKGROUND OF THE INVENTION

Material and equipment theft on construction sites and residential homes have been a major concern for contractors and individuals alike. Battery operated and cord attached power tools are usually easy to steal due to portability and are stolen for obvious monetary and practical value.

A number of diverse types of systems for preventing the theft of power tools have been devised, but the known systems are not entirely satisfactory for practical reasons.

Transmitter and receiver type power tool security systems exist wherein the operation of the power tool comprises of a code signal receiver on the tool to access power to the tool and a transmitter supplies the code signal. The code signal transmitter is fixed within the vicinity of the tool or workplace and the tool with receiver is deemed inoperable once it is beyond the bounds of the radius of the transmitter. The object of this invention is to ensure that the tool is used within an authorized workspace. This is to prevent theft, as the tool is deemed inoperable outside of the vicinity of the workspace. This method limits the tool as portable to other displaced areas within a workspace such as another floor of a building or adjacent workspaces within the area. The residential use is limited in that every home with said device would require a transmitter. The transmitter is to be transported where the tool is to be operated. Transmitters may become lost through various transportation occurrences of the tool. Similar varieties of this invention have been used in applications such as clothing apparel and library books where an alarm consists of audio, visual or both.

Several types of devices utilize a power cord lock by preventing the power cord from being inserted into an electrical outlet. The plug is locked by inserting the prongs of the plug into holes in the center block, which are sized and positioned to accept standard two or three prong plug configurations. The device may be permanently retained on the power line. This device pertains to the electrical cable associated with the device. This represents a simple means of securing electrical equipment, however, severing the cord and installing another plug to the end of the severed cord can easily breach it. This invention is also impractical with cordless power tools.

SUMMARY OF THE INVENTION

The present invention pertains to an activation code and ownership identification system for power tools, and particularly to a system that prevents the operation of the power tool unless a coding device, such as a combination code keypad is properly operated.

The device has a built display device such as a Liquid Crystal Display (LCD) or Light Emitting Diode (LED) that displays the phone number of the owner or authorized possessor of the power tool in the event the tool is lost or stolen. Once the correct code is inputted into the keypad a first timer within the activation control system allows a relay to effectively close an electrical circuit and allow the power tool switch to access electricity without re-entering the code for a predetermined set time. As long as the activation control system and timer has power connected to it, it may last from one minute up to several hours depending on the predetermined set time. If the power is effectively interrupted during the timed sequence, the timer is reset. Ideally, the timer will last for four hours before the activation device is set to an off position and the relay is effectively opened disrupting electricity to the power tool.

The object of the present invention is to provide an easy to use, low cost method to implement a security system that effectively conceives a secure power tool with the identity of ownership. The ownership principle benefits lost or stolen tools. A benefit for the activation control system may render the tool inoperable to unauthorized or inexperienced individuals. Advanced applications with the security device may include a low power sleep for battery operated power tools to reduce consumption of electrical power from the power source. Other advanced applications may include a display device that displays with alphanumeric capabilities.

As said, the present invention provides an activation code and ownership identification system for power tools. The system comprises a keypad for a code-input device for inputting a code. The keypad also serves as an input device for maintaining current digits for the display device and modifying an existing authorization code. The keypad is preferably mounted externally on the upper portion of the back handle of the power tool. This position on the handle allows the user to access the keypad device by means of thumb presses. The keypad accepts an activation code by an authorized user in order to activate the power tool. The keypad is recessed to a certain depth within the power tool handle and is laminated for protection from direct forceful contact, impacts, and natural elements.

A programmed activation system or microcontroller controls electrical power to the power tool. The microcontroller includes non-volatile but programmable storage for storing predetermined or programmable codes. The microcontroller also contains a comparison means for comparing the inputted code with the stored code. The microcontroller is connected to a signal actuated switching device, such as a relay and subsequent relay contacts, when actuated, to enable and interrupt electricity to the power tool. If power is interrupted, the relay is disengaged and contacts in the vicinity of the relay are effectively opened, which then obviates the need to reinsert the code. The electronic system also comprises a resetting circuit effective to reset the comparison means whenever there is a deviation in the combination or sequence of the inputted numbers from the stored code before the enabling device is actuated. However, it is

ineffective to reset the comparison means whenever there is such a deviation after the enabling device has been actuated.

Another aspect of the invention further includes a first and second timer, which are both controlled within the microcontroller by a clock or accumulator. The first timer or accumulator within the microcontroller operates in conjunction with said relay allowing electricity to the switch for operation of the power tool consisting of an interval of time from several minutes to twelve hours, the preferred delay time is four hours.

Another aspect of the invention further includes a second timer or accumulator within the microcontroller in conjunction with a display device allowing the display of numeric information in the form of a phone number regarding the owner or authorized possessor of the power tool. The second timer or accumulator is effectively activated from a certain keypress on the keypad that then actuates the display device, once the interval time is concluded, the display device is effectively turned off. The interval of time may range from a few seconds to several hours, the preferred delay time is thirty seconds. This feature allows lost, stolen or within other circumstances a contact phone number of the owner or authorized possessor of the power tool.

The activation system further includes storage for the numeric display device such as the phone number. The display device may incorporate a liquid crystal display (LCD) or light emitting diode (LED) to display a phone number. In more complex microcontrollers, other alphanumeric information of the owner or authorized possessor of the power tool may be displayed. The display device is controlled by the microcontroller and powered by the power supply to the power tool.

The system further includes a master code inputted from the keypad and used for effectively altering or determining activation codes for the activation relay and digits for the phone number for the display device.

To protect the microcontroller, display device, and other related components of the activation control and identification system from shock, vibration, impacts and the like, the device is to be encased in a protective shock absorbing substance. To further protect the invention from tampering, the microcontroller and other components are to be further encased in a protective housing within the handle of the power tool.

These advantages, objects, and features will become apparent from the following description and the accompanying drawings, which are incorporated herein as part of the disclosure of the invention.

The object of the present invention is to provide an activation code and ownership identification system for power tools.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

FIG. 1 is a pictorial rear view of a power tool of a first preferred embodiment including the keypad with a display device.

FIG. 2 is a sectional side view disclosing the location of the keypad and protective housing within the power tool handle so that internal components of the activation control system and wires are not easily accessible by an individual.

FIG. 3 is an electronic block diagram of the activation control system of FIG. 1 and FIG. 2.

FIG. 4 is a flow diagram of the first embodiment of the activation control system.

FIG. 5 is a flow diagram of the second embodiment of the activation control system pertaining to the display device.

FIG. 6 is a flow diagram referring to the function of inputting a personal phone number to be stored into the activation control system memory for the display device.

FIG. 7 is a flow diagram referring to the function of inputting an activation code to be stored into the activation control system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

I. Introduction and Environment

Turning now to the figures, FIG. 1, there is illustrated the activation code and identification system on the upper portion of the back handle of an electric power tool. The device in FIG. 1 is to prevent operation of electric power tools until a correct code is inputted into the device via the keypad 1. In the illustration of FIG. 1 an activation code and identification system embodies the code-input device that is a numeric keypad 1. The activation code is input into a microcontroller from said keypad 1. A display device 2 attached to the microcontroller and keypad for displaying the numeric phone number information about the owner of the power tool. A shock absorbing substance 3 encloses and protects the activation control system to sustain such impacts as drops or vibrations caused by use of the power tool. The keypad may be laminated or covered in a variety of ways to protect it and the device from hazardous weather or natural elements.

FIG. 2 illustrates the keypad 4 recessed into the handle by a certain depth so as to protect the keypad from direct impact. FIG. 2 also displays the keypad 4 as encased within a protective housing 5. The activation control system, relay etc. are also encased within the protective housing 5 within the power tool handle to protect it from human intervention.

Referring to FIG. 3, the activation control system includes a numeric keypad 8 that is connected to a programmable microcontroller 7. The keypad 8, having decimal number keys identifying the numbers 0-9, (plus # and * keys for a total of 12 keys). Keys must be depressed according to a predetermined combination and sequence in order to actuate the relay 9 so as to enable electricity to the power tool switch 16. The microcontroller 7 is connected to an activation relay 9. The activation relay 9 is connected to a power tool to be controlled 10. Under certain technical circumstances and dependant on battery operated (cordless) and cord attached power tools, the system is operable from the power supply 11 that may range from millivolts and volts less than 110 volts DC to 110 and 220 volt AC inputs. The microcontroller 7 has an internal storage and a plurality of internal data registers 13. The keypad 8 is connected to the microcontroller 7 via an 8 bit I/O port 14.

The relay 9 in FIG. 3 is connected to the power supply 11 via a switch 15. A pair of normally open relay contacts selectively connects the power supply 11, to the power tool switch 16. Once the power supply 11 is detached or depleted from the power tool 10, as the case may pertain to either that of battery or cord attached (corded), the microcontroller 7 causes the relay 9 to set itself to the normally open condition. Once an activation code is inputted into the keypad 8, the relay 9 remains closed allowing power to be accessed to the power tool from the switch until a first timed sequence is concluded. The first timed sequence within the microcontroller 7 for the relay 9 is preferably four hours. The first timed sequence in the microcontroller 7 is operated in conjunction with an accumulator 19 and comparator 20. Once the value in the accumulator 19 is equal to the comparator 20, the relay contacts are effectively opened. When a power supply 11, that is battery or cord attached, is attached to the power tool, the activation code and identification system is effectively powered up and ready for activation thereby reducing the need for excess power.

The display device 18 is connected to the microcontroller 7 via a microcontroller I/O port 17. The display device 18 is positioned in or within the area of the keypad 8. The display device 18 can display numeric information preprogrammed in the microcontrollers' 7 storage 12. The function for the display device 18 is to display the numeric phone number of the owner of the power tool. The display device 18 may be activated by pressing a certain key on the keypad 8, such as the pound (#) or star (*) key, and remains active until a second timed sequence is concluded. The second timed sequence within the microcontroller 7 for the display device 18 is preferably thirty seconds. The accumulator 19 and a comparator 20 are provided for the second timer as well. It should be noted that, although the accumulator 19, comparator 20, etc., are shown as discrete components, they can be internal programmed functions of the microcontroller 7. Other devices for specific components mentioned in the above paragraphs, however, may also be used.

Referring to FIG. 4, a flow chart depicting a logical algorithm of a first embodiment of the system is illustrated. In this embodiment, the power tool to be controlled is normally inoperative until the entry of a validation code from the keypad. At block 1 the battery or cord attached (corded), the power supply, to the power tool powers up the microcontroller. The initialization code is received 2 and is compared with the stored code at block 3. At block 3 the inputted code is compared against a valid stored code and if the inputted code is valid then, at block 5, the four-hour timer begins within the microcontroller. At block 6 the relay is enabled, closing the relay contacts and thus connecting electrical power to the power tools' switch and allowing operation of the power tool. During this four-hour interval of time, as long as the power supply is connected and delivering power to the microcontroller, the relay 6 remains closed. At block 7, the display device is turned on and the phone number displays on the display device 7 screen. The display of the phone number on the display device 7 may indicate that the inputted code is valid and the relay contacts 6 are closed. At block 8, while the microcontroller is incrementing the accumulator (four-hour timer) it is compared to the stored number. The stored number in this circumstance is a value used against the comparator to indicate a passage of an interval of time. When the two numbers match, at block 9, the relay contacts 6 open, interrupting electrical power to the power tool switch. At block 10, if the electricity to the power tool is interrupted, the relay contacts 6 open and the timer 5 resets.

Referring to FIG. 5, a flow chart depicting a logical algorithm of the second embodiment of the system. In this embodiment, the display device 7 displays the phone number of the owner of the power tool when a certain key is depressed. Starting at block 1 the battery or mains-connector, the power source, to the power tool powers up the microcontroller. At block 11, after a certain key is depressed, activates the thirty-second timer 12 within the microcontroller. The display device 7 displays the phone number of the owner of the power tool. At block 13, the accumulator (thirty-second timer) is compared to the stored number and when the two numbers match, the display device 14 is shut off. If the power supply 1 is detached or depleted from the power tool at block 19, as the case may pertain to either that of either battery or cord attached (corded), then the timer 12 resets. If the activation key 15 is depressed while the accumulator is incrementing, the timer is subsequently reset and begins incrementing the second timer again.

Referring to FIG. 6, a flow chart depicting a logical algorithm of the third embodiment of the system. In this embodiment, the microcontroller is programmed by the owner to accept a series of numbers, representing a phone number for the display device. Starting at block 1, the battery or mains-connection from the power tool powers up the microcontroller. At block 16, the initialization master code is entered and checked for validity against a predetermined stored code at block 17. At block 18 the owner enters a phone number for the display device. The entered digits representing the phone number are then stored 24 within the activation control system storage.

Referring to FIG. 7, a flow chart depicting a logical algorithm of the fourth embodiment of the system. In this embodiment, the microcontroller is programmed by the owner to accept a series of numbers, representing an activation code for activating the relay. Starting at block 1, the battery or mains-connection from the power tool powers up the microcontroller. At block 20, the initialization master code is entered and checked for validity against a predetermined stored code at block 21. At block 22 the owner enters a code number for activating the relay. The entered code is then stored 23 within the activation control system storage.

It is to be understood that the disclosed embodiments are merely exemplary, of the invention, which may be embodied in various forms. Therefore, specific structural and functions details disclosed are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure.

CLAIMS

What I claim as my invention is:

1. An activation control system, for use with a power tool, the activation control system comprising:

- (a) a code input device for inputting a code such as a keypad, keyboard or similar;
- (b) a digital processing means such as a microcontroller, microprocessor or similar;
- (c) a display means such as a LCD, LED or similar;
- (d) a switching means such as a relay, TRIAC or similar.

2. The system according to claim 1, wherein:

- (a) a storage device, connected to said code input device, including a non-volatile memory for storing a predetermined master code;
- (b) the storage device, connected to said code input device, including a non-volatile memory for storing several digits representing a phone number;
- (c) the storage device, connected to said code input device, including a non-volatile memory for storing an activation code.

3. The system according to claim 1, wherein:

- (a) the activation control system including comparison means for comparing the inputted code with the stored code;

4. The system according to claim 1, wherein:

- (a) the activation control system including relay means or a TRIAC for selectively controlling electrical power to the switch connected to the power tool;

5. The system according to claim 1, wherein:

- (a) the activation control system including a first timer, activated by the activation code inputted from the keypad to actuate switching contacts to a closed position which allows electricity to the power tool switch;
- (b) the activation control system including the switching means for selectively controlling electrical power to the switch connected to the power tool, the activation control system including means for selectively controlling the switching contacts to close

during a first predetermined time period, but to open the switching contacts after the first predetermined time period has passed or electrical power is interrupted;

(c) the activation control system including a second timer, activated by the code input device to actuate a display means.

6. The system according to claim 1, wherein:

(a) the activation control system including a display means, activated by the code input device to display numeric information about the authorized possessor of the power tool, the numeric information is a phone number.

7. The system according to claim 1, wherein:

(a) a master code, predetermined within the activation control system storage, to modify codes and digits within the activation control system non-volatile memory.

8. The system according to claim 1, wherein:

(a) a clock means or accumulator component connected to or internal to the digital processor;

(b) a comparator within the digital processor, is used for indicating when said clock value is equivalent to the first predetermined time period;

(c) a comparator within the digital processor, is used for indicating when said clock value is equivalent to the second predetermined time period.

9. The system according to claim 1, wherein:

(a) said code input device comprises a keypad for inputting a plurality of predetermined numbers according to a predetermined combination and sequence representing a master code;

(b) said keypad used for inputting numeric information representing an authorization code into non-volatile memory;

(c) said keypad used for inputting numeric information representing a phone number into non-volatile memory.

10. The system according to claim 1, wherein:

(a) said activation control system comprising a resetting circuit effective to reset the comparison means wherever there is a deviation in the combination or sequence of the inputted numbers before the enabling device is actuated, but ineffective to reset the

comparison means whenever there is such a deviation after the enabling device has been actuated;

(b) said activation control system comprising a resetting circuit effective to reset the comparison means whenever there is an interruption in the power supply.

11. The system according to claim 1, wherein:

(a) said activation control system and said keypad are recessed and protected within the power tool handle to be less accessible to direct impacts, preventing damage to the keypad, display device, and electronic components of the activation control system.

12. The system according to claim 1, wherein:

(a) said activation control system and said keypad are enclosed within a shock absorbing substance to protect the system from vibrations and impacts of the power tool.

13. The system according to claim 1 wherein:

(a) the activation control system components including the, relay, keypad, display device, and other electronic components necessary for operation are protectively housed within the power tool handle.

14. The system according to claim 1, further comprising:

(a) a display device mounted with said keypad on the power tool in which the display device is operably controlled by the activation control system;

(b) a display device mounted with said keypad on the power tool in which information displayed on the display device is stored within the non-volatile memory in the activation control system;

(c) a display device mounted with said keypad on the power tool in which the information displayed on the display device is a phone number of the authorized possessor of said power tool.

15. The system according to claim 1, wherein said electronic system is to include a first timer:

(a) the first timer controlled by the clock or accumulator within the activation control system;

(b) the first timer initiated from an activation code inputted to the keypad, at which a signal closes the switching contacts allowing electricity to the power tool switch, said switching contacts remain closed during a predetermined set time in the activation control system consisting of a range of several minutes -12 hours.

16. The system according to claim 15, wherein:

(a) said comparator means recognizes the passage of a predetermined time period, the activation control system resets the timer means and opens the switching contacts which interrupts electricity to the power tool switch and remains inactive until the activation code is inputted.

17. The system according to claim 1, wherein said electronic system is to include a second timer:

(a) the second timer controlled by the clock or accumulator within the activation control system;

(b) the second timer controlled by the clock or accumulator, is activated by a keypress from a certain key from the keypad which then actuates the display device from the activation control system and displays the digits of the phone number of the owner or authorized possessor of the power tool during a predetermined set time in the activation control system consisting of a range of a few seconds to several hours.

18. The system according to claim 17, wherein:

(a) said comparator means recognizes the passage of a predetermined time period, the activation control system resets the timer means and turns the display device off.

19. The system according to claim 1, wherein:

(a) the power source to operate the activation control system, display device, switching means, keypad and other components of the activation control system is powered by the battery for cordless electrical power tools and electricity from an electrical source in cord attached electrical power tools.

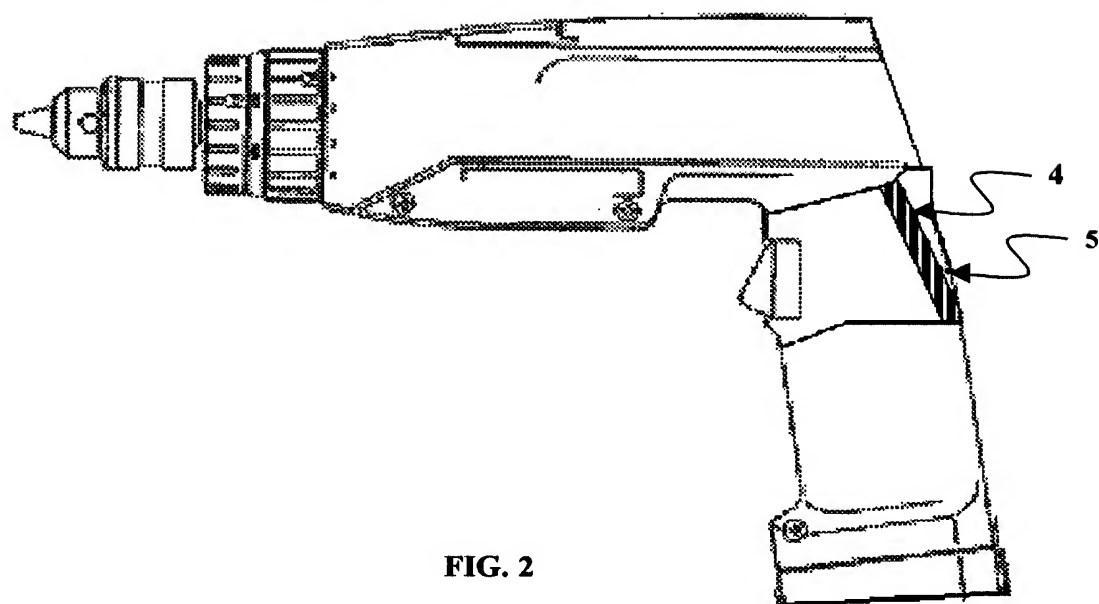
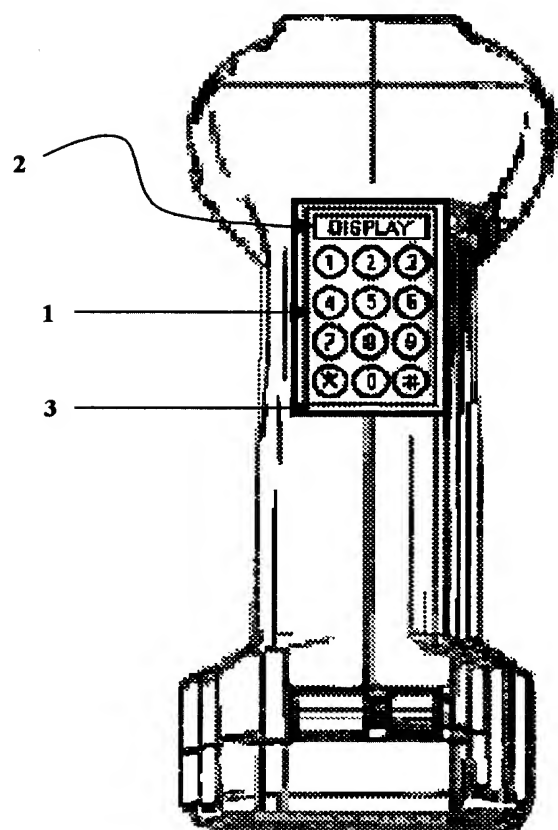


FIG. 2

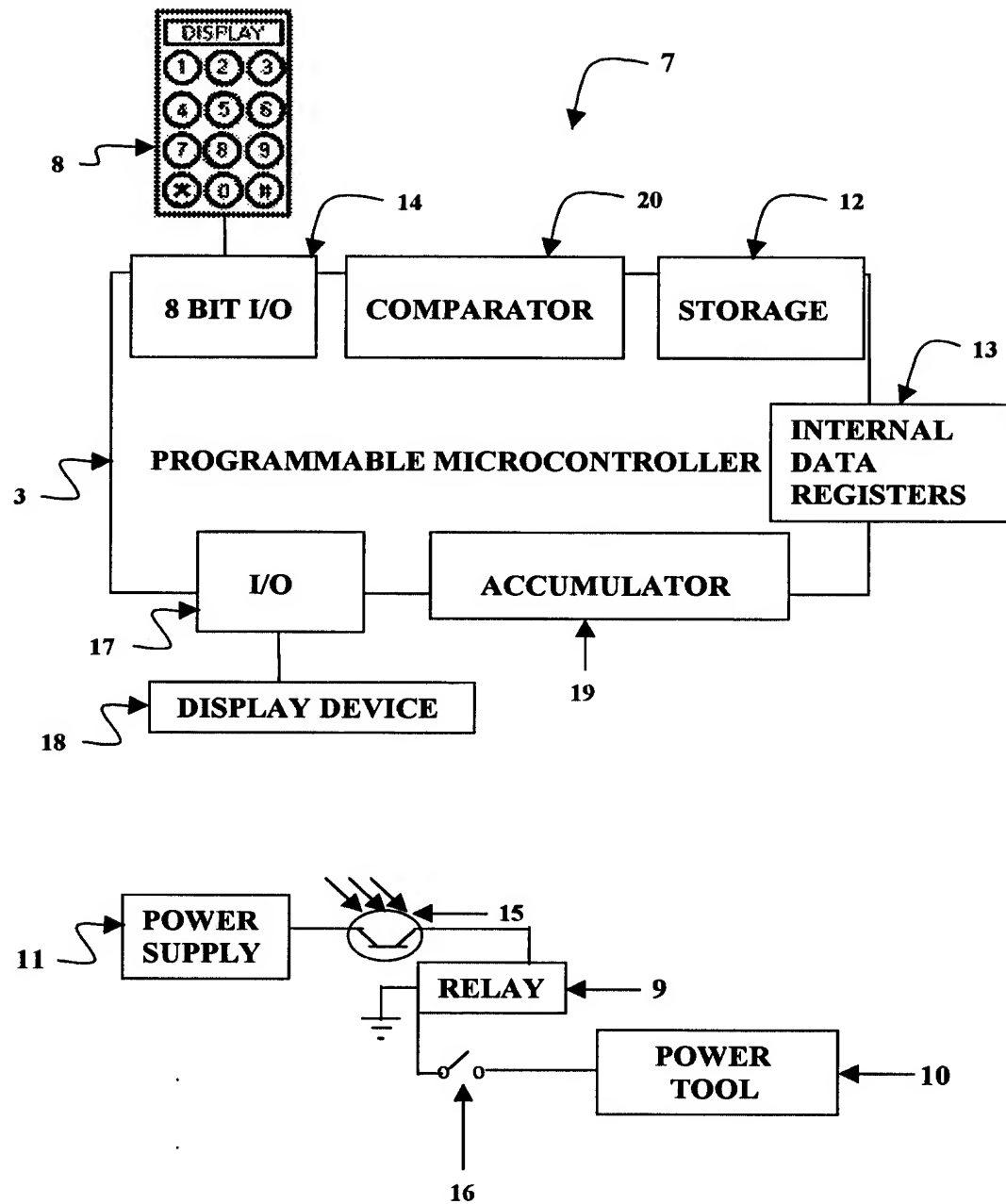


FIG. 3

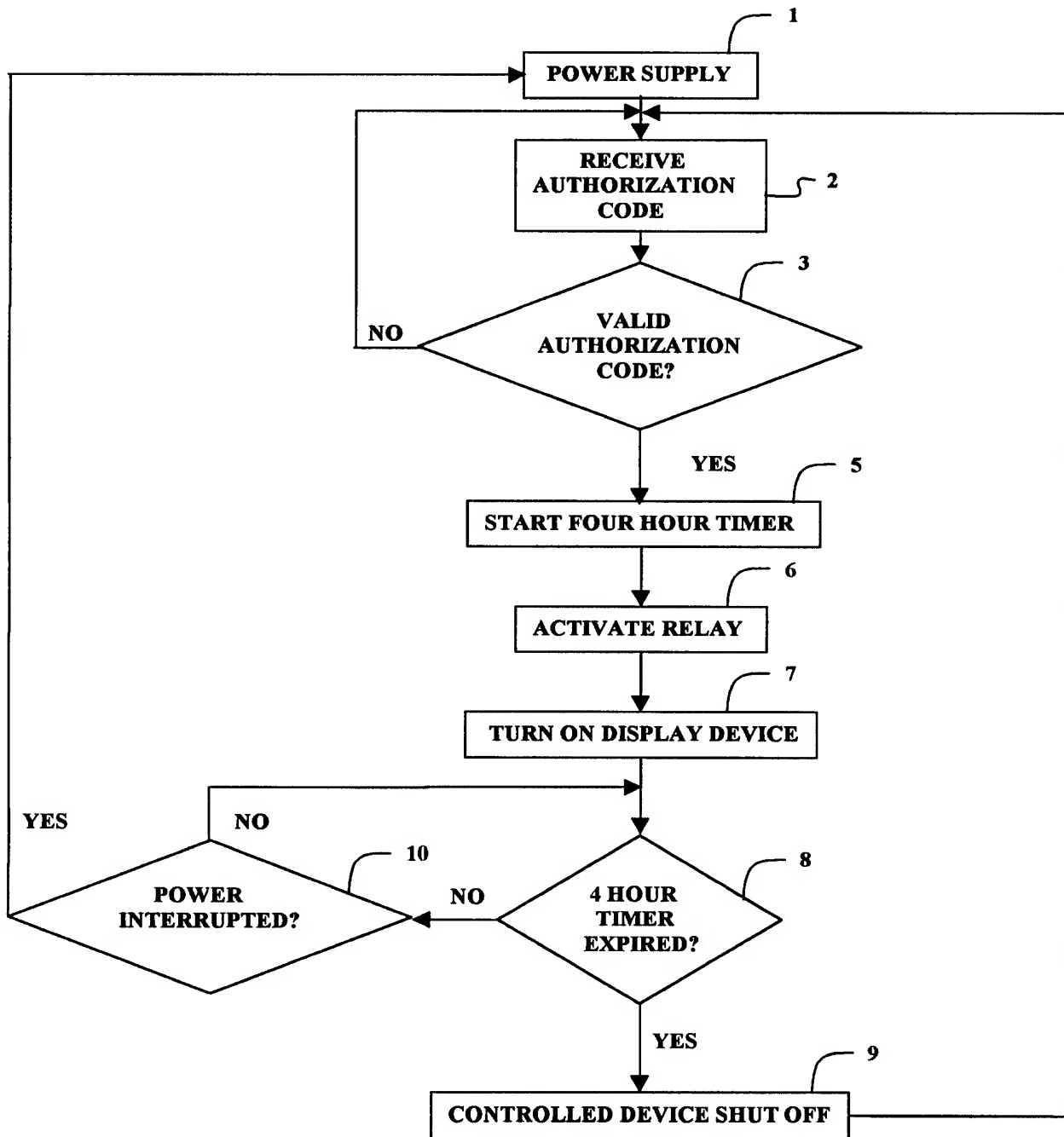


FIG. 4

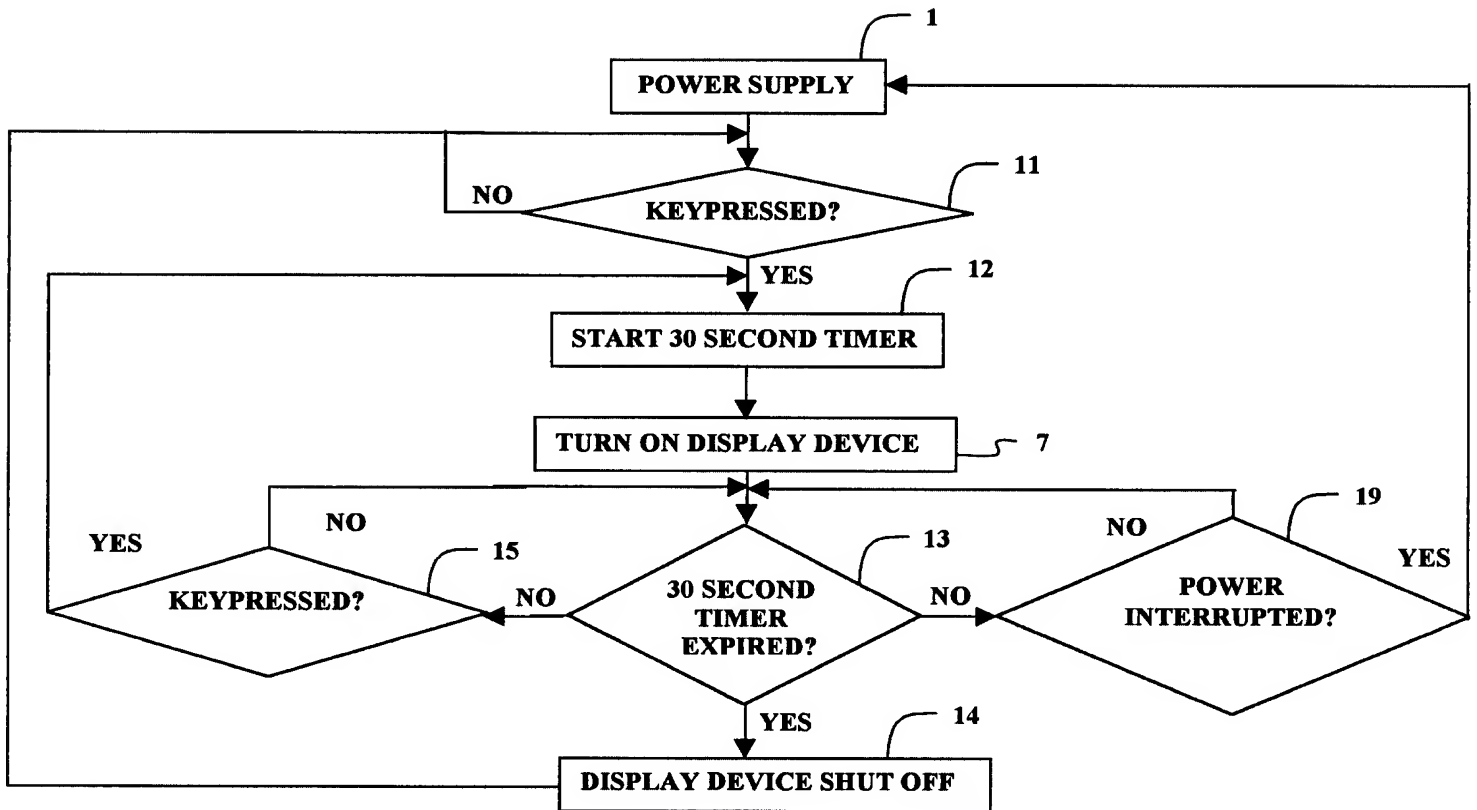
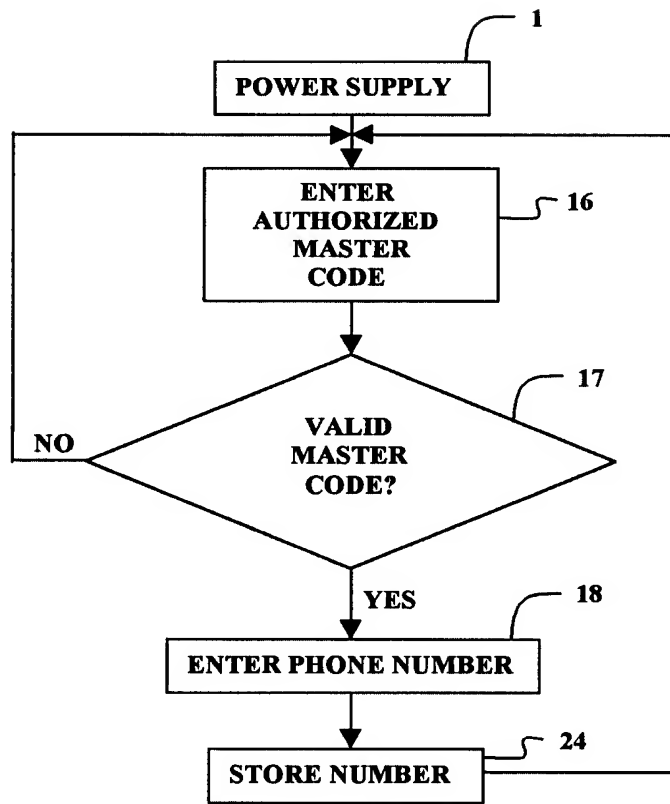


FIG. 5

**FIG. 6**

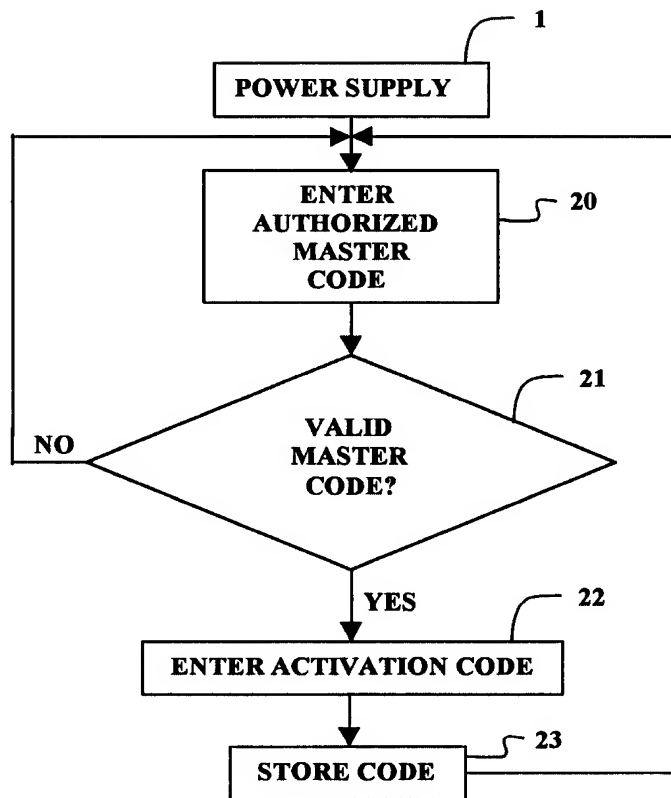


FIG. 7

